

## **Semi-quantitative modelling of gene regulatory processes with unknown parameter values using Fuzzy logic and Petri nets**

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**Abstract.** Petri nets are a well-established modelling framework in life sciences and have been widely applied to systems and synthetic biology in recent years. With the various extensions they serve as graphical and simulation interface for both qualitative and quantitative modelling approaches. In terms of quantitative approaches, Stochastic and Continuous Petri nets are extensively used for modelling biological system's dynamics if underlying kinetic data are known. However, these are often only vaguely defined or even missing. In this paper we present a fuzzy approach, which can be used to model biological processes with unknown kinetic data in order to still obtain quantitatively relevant simulation results. We define fuzzy firing rate functions, which can be used in Continuous Petri nets and

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